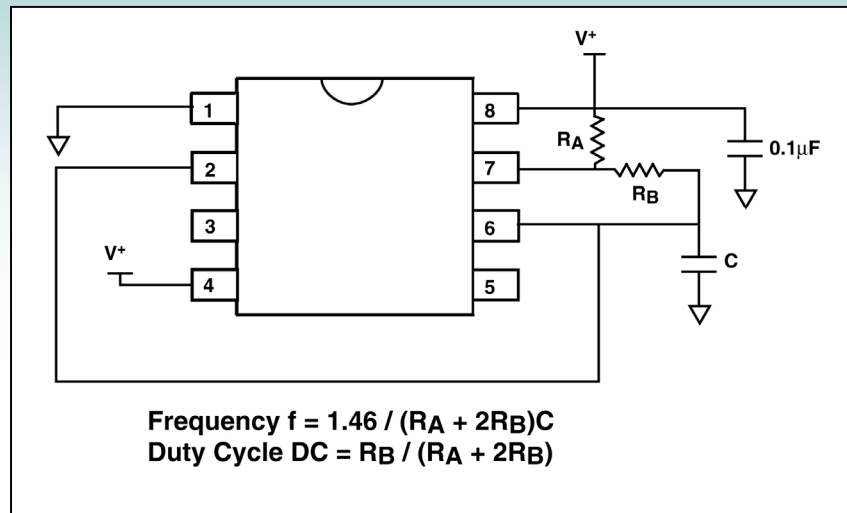




**Astable Mode Operation (Free Running Oscillator)**



**Description**

This circuit is configured in astable mode of operation, which is a basic oscillator circuit using a 555 type of timer. The circuit is also sometimes referred to as a free running oscillator, with the oscillation frequency given by  $f = 1.46 / ((R_A + 2R_B) \times C)$ . Initially, Capacitor C charged towards  $2/3 V+$  via  $R_A$  and  $R_B$ . When the voltage on C reaches that threshold level, the Discharge Output on pin7 is turned on, discharging C. When voltage on C is discharged to  $1/3 V+$ , it triggers the comparator inside pin2, turning off the Discharge Output and starts the C charging cycle again. Hence through the charging and discharging cycles, an oscillator circuit is implemented. The output high time period is determined by  $T_H = .693(R_A + R_B) \times C$ . The output low time period is determined by  $T_L = 0.693 R_B \times C$ . Using CMOS versions of 555 timer circuits, a very wide frequency range at very low level of voltage spikes and power dissipation can be achieved. Selection of the values of  $R_A$  and  $R_B$  is limited by the input leakage specifications of the timer at pin7, pin2 and pin6.  $R_A$  and  $R_B$  resistor values are also limited by the internal leakage current at the capacitor C. C usually has a range from  $10,000\mu F$  down to 0. When C is at 0 value, the timer will oscillate without an external C, relying entirely on the internal parasitic capacitor inside the 555 timer for oscillation.

**Recommended Components**

ALD555, ALD1502,  $1/2$  ALD2502,  $1/4$  ALD4501

**Other Related Circuit Ideas**

Schematic no. osc\_42002.0 RC Oscillation Circuit

Schematic no. osc\_42004.0 Wien Bridge Oscillator (Rail-to-Rail) Sine Wave Generator